

### REQUEST FOR RECONSIDERATION

Claims 1-17 remain active in this application.

The claimed invention is directed to a process for preparing prepolymers containing isocyanate groups.

Applicants wish to thank Examiner Gillespie for the helpful and courteous discussion held with their U.S. representative on July 27, 2009. At that time, Applicants' U.S. representative argued that there is no disclosure to remove, block or deactivate an organometallic catalyst **before** separating of a monomeric diisocyanate in the preparation of isocyanate containing prepolymer. The following is intended to expand upon the discussion with the Examiner.

Prepolymer preparation having a low degree of polymerization and a narrow molecular weight distribution as well as a low content of monomeric diisocyanate are sought after as providing more uniform properties for a polyurethane. While the product distribution may be adjusted by changing the stoichiometric ratio of reactants, the result is typically a large molar excess of diisocyanate which must be removed, introducing additional complexity and costs and sometimes resulting in undesirable residual diisocyanate content. While unsymmetrical diisocyanates have been used in the preparation of isocyanate prepolymers having a low degree of polymerization and a narrow molecular weight distribution, such processes have not provided entirely satisfactory results such that further methods for producing isocyanate prepolymers are sought.

The claimed invention addresses the problem by providing a process for preparing isocyanate prepolymers comprising reacting unsymmetrical diisocyanate with an isocyanate reactive compound in the presence of an organometallic catalyst, followed by removal of excess monomeric diisocyanate, wherein the organometallic catalyst is either removed, blocked or deactivated **before removal of monomeric diisocyanate**. Applicants have

discovered that removing catalytic activity of the organometallic catalyst **before** separation of the monomeric diisocyanate provides for an efficient process for preparing isocyanate prepolymers of a low degree of polymerization and narrow molecular weight distribution. Such a process is nowhere disclosed or suggested in the cited art of record.

The rejection of claims 1-17 under 35 U.S.C. § 103(a) over Paulsen et al. (U.S. 2003/0024639) in view of Hippold et al. (U.S. 2003/0162933) and Duff et al. (U.S. 5,382,602) is respectfully traversed.

None of the cited art of record discloses or suggests catalyst removal, blocking or deactivation **before** separation of monomeric diisocyanate.

Paulsen et al. has been cited for a disclosure of “perfect prepolymer having an A:B:A structure having a low residual diisocyanate monomer content.” Such a prepolymer is described as being commercially available as Airthane<sup>®</sup> but paragraph [0032] fails to disclose how such a prepolymer is obtained. The use of a catalyst and deactivation before removal of monomeric diisocyanate is not disclosed. While paragraph 4 of the Official Action cites to paragraph [0040] for a disclosure of a catalyst, Applicants note that the catalyst used is a component of a urethane structural adhesive composition and is not described as a component in the preparation of an isocyanate prepolymer. Since the reference fails to disclose the use of a catalyst in the preparation of the prepolymer it cannot disclose the removal of the catalyst prior to removal of monomeric diisocyanate.

While page 3 of the Official Action asserts that Paulsen et al. fails to disclose how the monomeric diisocyanate level is obtained or catalyst deactivation/removal, applicants note that the reference cites at paragraph [0034] U.S. Patents 4,786,703 and 5,202,001 for the preparation of prepolymer. Neither of these cited references disclose or suggest preparation of prepolymer using a catalyst. Starnner et al. (U.S. 4,786,703) discloses use of an organometallic catalyst in the curing of a polyurethane formation (column 6, lines 3-12) but

fails to disclose the use of a catalyst in the preparation of prepolymer. Starner et al. (U.S. 5,202,001) discloses preparation of polyurethane prepolymer beginning at column 2, line 66 through column 3, line 47 but fails to disclose use of a catalyst and accordingly cannot disclose removal of catalyst prior to removal of diisocyanate monomer.

Hippold et al. merely has been cited for reduction of diisocyanate monomer by distillation but fails to disclose the use of a catalyst and accordingly cannot suggest removal, blocking or deactivation of catalysts prior to removal of excess diisocyanate. Applicants note that the disclosure of Hippold et al. is similar to that of Starner et al. (U.S. '001) insofar as the crude prepolymer is purified by distillation to facilitate removal of residual diisocyanate.

Duffy et al. has been cited for disclosure that storage stability of a **polyurethane** may be enhanced by catalyst deactivation performed at the end of polymerization to help prevent decomposition of the polyurethane foam (column 4, lines 38-42). There is no step of removing diisocyanate monomer from the polyurethane foam so there can be no suggestion of removing catalyst activity prior to removal of diisocyanate monomer from prepolymer. Further, since there is no disclosure or suggestion of use of a catalyst in the preparation of prepolymer there can be no disclose or suggest of removal, blocking or deactivation of catalyst prior to removal of monomeric diisocyanate.

Thus, the disclosures relied upon by the examiner fail to disclose or suggest a method in which organometallic catalyst is removed, blocked or deactivated prior to removal of monomeric diisocyanate.

While the examiner has attempted to provide motivation for deactivation of catalysts in an isocyanate-containing composition, such deactivation is noted in the preparation of a polyurethane (Duffy et al.), not an isocyanate prepolymer. As such any disclosure of enhanced foam stability for a polyurethane foam would not suggest to one of skill in the art deactivation of catalyst prior to removal of diisocyanate monomer from a prepolymer. In

short, the record is completely absent any disclosure or suggestion to remove catalyst activity prior to removal of monomeric diisocyanate. Such a failure is made clear by the examiner's disclosure on page 3 that Paulsen et al. fails to disclose catalyst deactivation.

Further, even though the cited references fail to disclose or suggest deactivation of a catalyst used to make prepolymer, there is no suggestion of when to remove such a catalyst in the preparation of prepolymer having a low monomeric diisocyanate level. During the discussion with the examiner, the examiner hypothesized that it merely would have been obvious to have deactivated the catalyst prior to removal of the monomeric diisocyanate. However, there is **no evidence of record** to suggest such timing of removal of catalyst activity and accordingly the claimed invention is not rendered obvious by the cited references.

Since there is no disclosure or suggestion of removal of catalysts prior to removal of monomeric diisocyanate, the claimed invention is clearly not rendered obvious by the references and accordingly withdrawal of the rejections under 35 U.S.C. § 103(a) is respectfully requested.

Applicants have addressed the objections to claims 2-17 in which these claims are now preceded by the article "the".

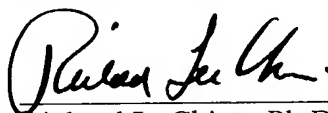
Applicants submit that this application is now in condition for allowance and early notification of such action is earnestly solicited.

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